

USSN: 10/015,572
Art Unit: 2161
Response to office action mailed 03/18/2005

Remarks

This response is being submitted by the undersigned pursuant to 37 CFR 1.34. An appointment of Agent will be submitted shortly under separate cover.

The applicants have clarified the term health as used in the claims. Instead the more precise term "operational performance" has been employed.

The prior art cited by the Examiner appears to have little connection with the invention that the applicants seek to protect. The difficulty appears to arise largely out of the generality of the claim language in the previous version of the claims. For example, as with any switch employing protection switching with redundant data paths, the intent was that the corresponding first and second datasources output essential the same data, so that in the event of failure of one datasource, the system switches seamlessly over to the other datasource. In the context of protection switching the expression "redundant data" has a particular significance. It refers to data that can be substituted for the primary data without loss of information if the primary systems fail. In the light of these comments, the claims have been amended to better define the subject matter of the invention. Care has been taken to avoid adding subject matter that is not either inherent or explicit in the original teaching.

In one embodiment, the invention is concerned with a communication or routing switch employing protection switching with 1+1 redundancy. Numerous references can be found on the Internet to 1+1 redundancy in this context. One reference (<http://pdfserv.maxim-ic.com/en/an/app388.pdf>) states that "One-to-one (1 + 1) redundancy refers to a configuration where each line card has a dedicated backup card waiting in case of failure". In such systems, duplicate components operate in parallel, one normally acting as a primary source for the next data processing element in the switch, and the other acting as a redundant or protection source for use in the event that the performance of the primary switch degrades to unacceptable levels. Of course, there could be more than one redundant source, referred to as N+1 redundancy).

The starting point of the invention is shown clearly in Figure 2. In normal operation the primary source 202 is active. If the operational performance (or "health") of the primary source 202 degrades to unacceptable levels, the system switches over to the secondary or redundant source 204. It is of course well understood by a person skilled in the art that in such a redundant system, both sources are outputting essentially the same data. The data is subject to errors, which of course may be different for the two sources. That is the whole

USSN: 10/015,572

Art Unit: 2161

Response to office action mailed 03/18/2005

point of protection switching. If the error rate of the primary source becomes too great, the system switches over to the redundant source. For the system to work, obviously the redundant (or backup) source has to be outputting the same data as the primary source. These features, which would be inherent to one skilled in the art, have been expressly stated in the claims.

The invention is concerned with the type of protection switch illustrated in Figure 2, and addresses the problem that in the prior art when the performance of the primary switch degrades beyond a certain level, the system will switch to the backup source (and therefore continue processing the same underlying data) when in fact the backup source, which is operating in parallel with the primary source, may have worse performance than the degraded primary source, in which case switching to the secondary source degrades the overall system performance still further.

The invention addresses this problem by providing the validation and assessment modules that assess the health (operational performance) of both sources, and chooses the one with the better performance. For example, by comparison with a prior art switch, in a situation where the degradation was observed in the primary source, if the assessment module observed that the performance of the redundant source was worse than the primary source, unlike the prior art, no switching of sources would occur. The system would continue operating with the better, albeit errored, primary source rather than switch over to the redundant source with the worse performance.

Independent claim 1 has been modeled on the generic embodiment illustrated in Figure 3, wherein the assessment module instructs the selector 306 to select one of the sources 302 based on their relative operational performance.

Independent claim 21 has been modeled on the exemplary embodiment illustrated in Figure 1B, wherein cross connects are provided in a chain of data processing elements so that either of the upstream active and redundant processing elements can be selected as the active source. Although both chains of data processing elements are operating in parallel, the active data path can "zig-zag" through the data elements of the two chains, depending on the operational performance of the various data processing elements. The prior art is totally silent as to such an arrangement.

It is noted that the Examiner has rejected the listed claims over VanDerrvort under 35 USC 102. VanDerrvort has little to connection with a communication switch with protection

USSN: 10/015,572

Art Unit: 2161

Response to office action mailed 03/18/2005

switching. VanDervoort merely discloses an instrument for identifying the types of cells in an ATM stream and updating appropriate statistical counters. It has nothing whatsoever to do with protection switching in a communication switch, where redundant data flow paths are present, as this term is understood by persons skilled in the art of protection switching.

In order to meet the test of anticipation, it is essential that

"each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

The Federal Circuit has also stated:

"An anticipating reference must describe the patented subject matter with sufficient clarity and detail to establish that the subject matter existed and that its existence was recognized persons of ordinary skill in the field of the invention". *ATD Corp. v. Lydall, Inc.*, 48 USPQ 2d 1321.

VanDerrvort teaches subject matter so remote from the invention, it is difficult to know exactly how the Examiner allegedly reads the claims onto its teachings. For example, it is not clear which data paths that the Examiner considers to be carrying "redundant data in parallel", a limitation found in the previous claims. The Examiner has just asserted that this feature is present in VanDerrvort without explanation, and since VanDerrvort teaches an ATM monitoring system that has so little in common with the invention, it is not apparent which feature the Examiner has in mind. As a further example, for the "assessment module", the Examiner identifies the "test processor 60" of Figure 7 of VanDerrvort. The test processor is an implementation of the test instrument of VanDerrvort, which examines the headers of cells passing through a node (see col. 6, line 40 – col. 7, line 10, which describes in some detail the function of the test processor. There is no suggestion that it should be used to switch in a redundant datasource in place of the primary source. As noted above, one of the problems appears to lie in the fact that although the invention is concerned with protection switching, the expression "first and second datasources" could refer to almost any source of data, whereas it is inherent in the invention that the sources output essentially the same data. One source is intended as a standby or substitute for use in the event of the failure of the other.

USSN: 10/015,572

Art Unit: 2161

Response to office action mailed 03/18/2005

The amended wording used above is intended to clarify these points. For example, in protection switching the expression "redundant data" means essentially the same data that is flowing in parallel with the active data and which is available for immediate use in the event of the failure of the primary components. Of course, if you have two data processing elements operating in parallel on the same input data, while in the one sense both can be said to be outputting the "same data" since they are performing the same operation on the same input data, the actual bit stream output by the two sources is not going to be quite the same because both are subject to different errors. The underlying purpose of the invention is to choose the source which has the best performance. The amended language has been chosen to reflect this intent.

With regard to the previous office action and the allegation of obviousness, it is noted that in order to establish a *prima facie* case of obviousness under 35 USC 103(a), it is well established that *inter alia*:

"the prior art reference (or references when combined) must teach all the claim limitations". See MPEP 2143. (Emphasis added);

"we presume knowledge by the inventor of all the prior art in the field of his endeavour. However, with regard to prior art outside the field of his endeavor, we presume knowledge from those arts reasonably pertinent to the particular problem with which the inventor was involved." (emphasis added) *In re Wood*, 202 USPQ 171; and

[a] reference is reasonably pertinent if ... It is one which, because of the matter with which it deals, logically would have commended itself to the inventor's attention in considering his problem... If a reference has the same purpose as the claimed invention, the reference relates to the same problem... [I]f it is directed to a different purpose, the inventor would accordingly have less motivation or occasion to consider it." *In re Clay*, 23 USPQ 2d 1058.

In the applicant's respectful submission both Bhatia and Guhu are non-analogous art since they do not have the same purpose as the present invention since they are not concerned with providing 1+1 (or even N+1) redundancy in a communication switch. They do not disclose, either alone or in combination, switching between a primary and redundant source (as those terms are understood in the art), both of which are nominally outputting the same data, depending on the performance of the sources.

USSN: 10/015,572

Art Unit: 2161

Response to office action mailed 03/18/2005

The invention overcomes an existing problem in the art, and the Examiner has not cited any art that teaches a solution to it. Furthermore, no legitimate combination of the prior art results, even accidentally, in the combination now claimed.

It is believed that with the above amendments, the application is in condition for allowance. Allowance and reconsideration are therefore earnestly solicited.

Respectfully submitted,



Registration No. 34519
Richard J. Mitchell
Agent of Record

MARKS & CLERK
P. O. Box 957, Station B,
Ottawa, Ontario, Canada
K1P 5S7
(613) 236-9561